



cordially invites you to an

## Interdisciplinary Seminar

with

**Dr. Harshana Rajakaruna**

on

### ***“Effect of yearly temperature cycles on species richness and population fitness: Insights from marine copepods”***

**Tuesday, November 21, 2017**

3:30-5 p.m.

*Reception & refreshments at 3 p.m.*

Hallam Auditorium, Room 206

1122 Volunteer Boulevard



Dr. Harshana Rajakaruna is a mathematical biologist currently working as a postdoctoral research associate in the Department of Microbiology at the University of Tennessee, Knoxville. His research focuses on modeling the dynamics of T-cell responses to malaria parasites. He has a Ph.D. in mathematical ecology from the University of Alberta and a master's degree in statistical methods in fisheries from the University of Newfoundland. He also has a master's degree in natural resource management and environmental economics and a bachelor's degree in mathematics from the University of Peradeniya. He was a researcher at the Mathematical Biology Unit, OIST University of Japan, an NSERC Visiting Fellow at Fisheries and Oceans Canada, and a Senior Program Officer at the International Union for the Conservation of Nature.

**Abstract:** Species richness ( $\alpha$ -diversity) and population fitness (intrinsic growth rate) of fast-maturing marine copepods are generally explained as functions of ambient temperature. However, such explanations commonly take into account the long-term average sea temperatures. Yet, sea temperatures fluctuate yearly and quite dramatically in some marine regions. We will illustrate how large amplitudes of yearly temperature cycles could reduce both species richness and population fitness of marine copepods resulting from reduced generation times. These reductions can be explained by Jensen's inequality, which relates the value of a concave function of an integral to the integral of the concave function. Scientific cruise survey data supports our theoretical model predictions. The study leads to the question whether the gradient of the amplitudes of temperature cycles, between habitats with similar yearly mean temperatures, ecological and environmental conditions, influences a class of fast-maturing copepods to colonize new habitats and increase species richness. The study also gives insights into range-expansion and diversity of species in the presence of a general rise in sea temperatures with changes in the degree of their fluctuations.